Annual Meeting
2004 Montana Fluvial Arctic Grayling Restoration Workgroup Meeting
February 20, 2004

The annual meeting of the Arctic Grayling Restoration Workgroup was held on February 20, 2004. Meeting participants reviewed work that was completed in 2003, discussed ongoing issues and priorities, and then reviewed the work plan for 2004.

LITIGATION/ESA Listing

Litigation was filed one year ago by the Center for Biological Diversity. The plaintiffs contend that the USFWS should have acted sooner (to list grayling) because the USFWS relied on voluntary efforts.

The USFWS is in the process of commenting back and forth on the complaint.

FWP has entered the case as amicus, and will be submitting briefs outlining what has been done and what we intend to do.

The Stockgrowers have also entered the case as an amicus.

A hearing on the case has been scheduled for a couple of months from now.

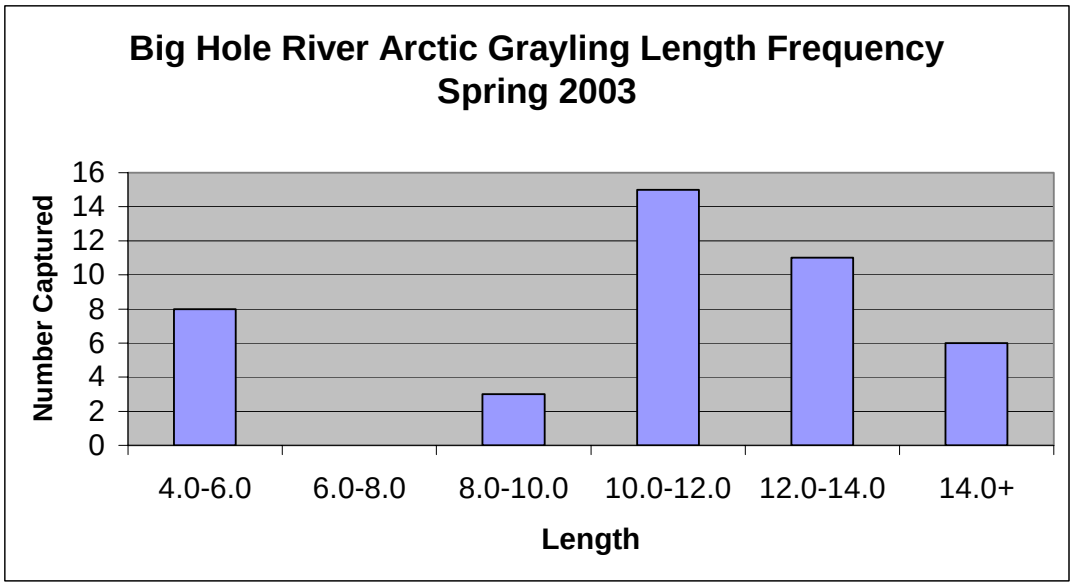
USFWS last year recommended that listing priority be upgraded to highest level – Dept. of Interior never signed off on that package, so no change in Candidate Status.

2003 EFFORTS

See handout

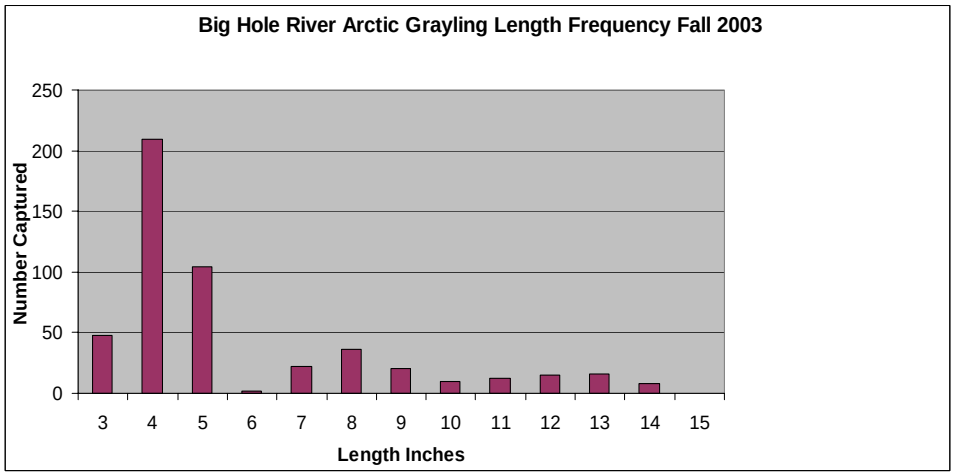
Big Hole River Population

Big Hole Spring Pre-Spawning surveys –> 43 adult grayling were captured = fewer than normal or average; 76% were spawning age fish (age 3+).



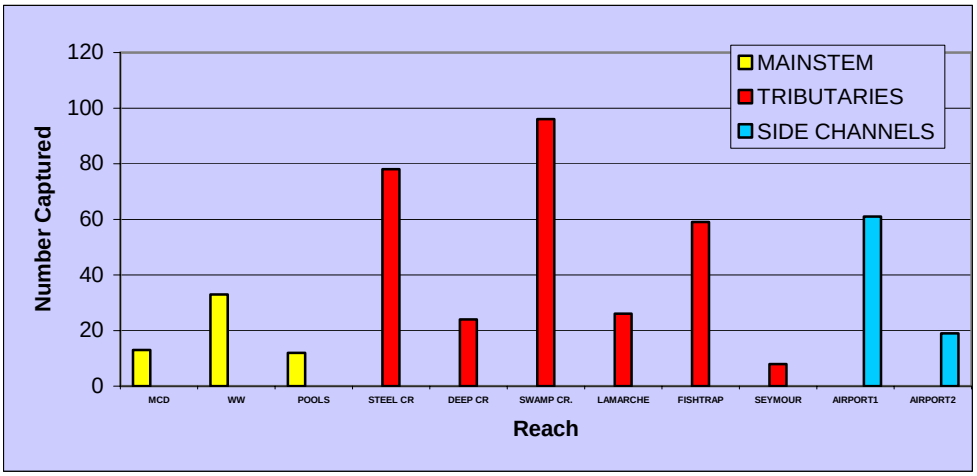
Have been getting very low numbers of grayling in core monitoring sections the past few years, so took a broader, stratified look in 2003. Looked at 29 tribs, of those, 10 were sampled by snorkeling or electrofishing (pools/reaches).

Found a lot of little grayling in the Wisdom sampling reach, as well as tributaries. Good numbers of YOY, but low numbers of older fish. McDowell section used to have high numbers of YOY, but that has tailed off in the past few years. Where there were increases of grayling in monitoring reaches, it is primarily attributable to increases in YOYs.



<u>Number of Age 0 and Age 1+ fish sampled in different tributary locations:</u>

LeMarche Creek: 91 Age 0+ and 46 Age 1+ per mile
Deep Creek: 40 Age 0+ and 33 Age 1+
McDowell: One Pass: 13 YOY, 0 Age 1+
Wisdom West: One Pass: 33 YOY, 0 Age 1+
Wisdom East: One Pass: 74 YOY, 4 Age 1+



Big Hole Habitat Monitoring

Habitat – FWP administers 14 thermograph stations, plus utilizes two USGS gauges. Have long- term temperature database going back to the 1990s. Temperatures were above 70 ^{o}F quite a bit of the time during summer 2003 in many of the reaches of the Big Hole. LeMarche Creek and Fish Trap Creek were exceptions, which is where a lot of the grayling were found.

Stream	Max ^{o}F	Days >70^{o} F	Days >77^{o} F
LeMarche Creek	69.0	0	0
Fishtrap Creek	72.5	8	0
Deep Creek	77.3	33	1
Steel Creek	78.7	50	6
McDowell	78.0	51	2
Pintlar	80.1	53	17
Christiansens	79.4	57	15
Sportsmans	79.4	54	8
Pennington	78.0	47	2

Flows - June flows were pretty good, above the wetted-p, which is likely why the YOY numbers were better. Side channels were connected, and no spawning areas dried out during June.

2003 Drought Management

Because of low flows and high water temperatures, the Drought Management Plan kicked in. As a result, water users were asked to cut back on water diversions, water conservation measures were implemented, and fishing regulations were modified. The Upper reach was closed to angling for 106 days per the Big Hole Drought Management Plan, the Middle reach was closed for 35 days per the Big Hole Drought Management

Plan, and 19 wells and 2 springs involving 14 landowners were used to water 12,858 cattle in a very cooperative effort spearheaded by the Big Hole Watershed Committee.

Number of days/year when flows were less than 20 cfs at Wisdom, the minimum flow recorded at Wisdom that year, and the flow as a percentage of the period of record.

Wisdom: Days < 20 cfs, Minimum Flow	June-September Monthly Flows as % of Period of Record
1988: 78 Days, 0 cfs	1988: 24%
2000: 49 Days, 7 cfs	2000: 13%
2001: 65 Days, 6 cfs	2001: 19%
2002 6 Days, 13 cfs	2002: 53%
2003: 61 Days, 9 cfs	2003: 49%

New Big Hole River Drought Management Plan Recommendations:

- 160 cfs from May 1 to June 31 to protect spawning and newly emerged fry
- No surveys in Wisdom West when flows are <20 cfs and max temps >64
- Temperature component tied to specific flows in the Middle Reach

Habitat:

Habitat consists of water quantity and quality, riparian health, temperatures, and fish passage.

Habitat data from OEA in 1994 was compared against abundance and distribution of grayling; found grayling abundance and overhanging vegetation were significantly correlated.

Doing a riparian habitat improvement project on Steel Creek – planting willows, fencing, etc. Continuing to work with landowners to maintain minimal flows and develop habitat projects.

Brood Stocks/Egg Take

Axolotl Lakes – tested negative for BKD throughout the year and after rigorous testing; Population size estimated at 2,125 fish aged 3, 5 and 6; 669,000 eggs were taken in 2003 = 1,338/female. Removed 350 for fish health (150) and Ruby River stocking (200) – raising 70,000 for socking in Spring 2004; 93,000 were stocked in the MO headwaters in 2003.

Green Hollow – tested negative for BKD; 255,000 eggs were collected – all went into RSIs on the Ruby; 837 eggs/female; 1,692 estimated adults aged 3 and 4. Removed 1,400 trout from the brood pond. Also put in barrier and trap to enable removal of trout.

Bozeman FTC – 770 for future brood, and 330 excess, but they have some deformities, plus 1,500 2-year-olds. Technically, still quarantined for BKD, so eggs/fish from this facility cannot be moved into the state hatcheries.

We may not want to move fish between FTC and Green Hollow and Axolotl for a few years to reduce chances of BKD in the brood sources until there is greater probability of not introducing additional BKD into the brood populations (monthly injections at FTC will have had a chance to work for awhile).

Genetics: **Send 50 YOY fish from 2003 progeny from each brood source, and continue thereafter each year – 50 from Axolotl, 50 from Green Hollow, and 50 from Bozeman FTC to monitor genetic status**

Restoration Efforts

Much of the restoration effort has centered on attempting to establish new populations of fluvial grayling, using brood sources developed from Big Hole Grayling. To date, the following stocking has occurred:

SITE	YEARS	# PLANTED	TOTAL
Ruby	97-02	YOY: 32,000 Y: 65,000 2: 2,350	99,350
N&SF Sun	99-01	Y: 35,000	35,000
Beaverhead	99-02	YOY: 5,065 Y: 78,000	83,065
Missouri HW	00-02	YOY: 123,636 Y: 63,000	186,636
TOTAL	97-02	YOY:160,701 Y: 241,000 2: 2,350	404,051

Ruby River Restoration Site

Last year we decided to focus on the Ruby River in 2003

Spring Sampling – 6 sampling reaches, single pass electrofishing surveys; approx. 1,200 stocked in each of 2001 and 2002. Six were recaptured, 10-12 inches in length.

Remote Site Incubators (RSI)– goal is to produce YOY grayling to produce a wild individual that is imprinted on natural natal areas of the ruby.

Used 18 incubators at 10 locations; put 5k to 25k eggs per incubator, 225k eggs per incubator. Eggs were treated with iodine, checked daily, dead eggs and sediment were removed.

Started on May 15 with green eggs. On May 25 runoff started, resulting in high flows and very muddy water – survival is thought to be zero.
Round 2 – 30k eyed eggs from axolotl lake brood using 1400 eggs per RSI and 7 egg baskets: resulting in 280 YOY in RSI #11. In fall, found 50 juveniles just downstream from #11. Site #11 was only site without a sediment flush. Also set it up with gravel in the bottom. Site #11 was only one that produced fish

Learned a lot in 2003. Will try again next year; but will adjust timing and locations to maximize success

Stocking – 36,975 age 1 and 2 fish were stocked in the Ruby in 2003; a dramatic increase in stocking numbers; Also changed timing of stocking to May before runoff and June rather than stocking them all in June post runoff. Stocked at 8 locations, all above Vigilante Station. Also stocked 200 grayling out of Axolotl Lake

Telemetry – tracked 20 grayling (9 from Bozeman FTC and 11 from Axolotl) – released them on June 10 and June 24. FTC fish released with 750 other fish. Axolotl fish released with 200 other fish. Avg. length was 10.9 inches.

206 relocations; maximum movement of 8.2 miles downstream; no major differences between sources of fish in habitat use or differences in distances moved. They used pools the most, and were found most often in deeper water. Use depth and turbulence for cover.

Axolotl fish moved upstream, FTC fish had tendency to move downstream.
FTC move avg. of 0.15 miles downstream; Axolotl fish moved average of 0.13 miles upstream. Could be due to differences in timing of release, stocking densities, or rearing environment.

Fall Sampling – 7 sampling reaches using single or 2 pass electrofishing surveys or backpack shockers. 1,275 were captured, including fish from RSI, age 1's from FTC and Bluewater, and age 2's from FTC. They were captured from just above the reservoir to the headwaters, with the center core area in the Vigilante Area. Condition factor was good in the fall. Doesn't appear that many have moved into the reservoir.

Low numbers in spring, but just hanging on. However, these were in spawning condition, indicating they are wanting to spawn.

Sun River: most are going down to Gibson Res. In 2003, there were 26 grayling caught in the reservoir, vs. 183 in 2002.

No grayling observed in 5 miles of snorkeling in the North Fork. Some reported from creel in the North Fork, but not many. No evidence of reproduction from planted fish

Looking at RSIs to imprint fish onto the streams to hopefully keep them from moving down into Gibson. If we do use RSIs, would have to do them in June when eggs are taken, but water temps there are still cold in the 40s

Looked into Lange Creek, a tributary to Gibson with about 1.5 miles of stream to a barrier falls. Had a lot of grayling in it in June. A month later, none were seen, but a lot of fry were observed.

Beaverhead River – very low flows; high water temps, poor survival. – on hold until conditions improve. Only 1 grayling caught in survey reaches (3), and a few were reported by anglers.

MO Headwaters – planted 93,000 YOY in 2002, but have been plagued by low flows and high water temperatures. No monitoring was done this year – will attempt to get in there this fall.

Brood Stock Discussions:

Never were able to confirm BKD source; Quarantine was lifted at Big Springs as of 2/19/04. Suspect drought and stress from drought might have contributed to positive test last year. Have since tested all sources extensively.

FTC – Brood Stock seems to be doing well. Want to do a 4 x 3 cross, but that might take up to 6 years. FTC wants to get together with key players to talk about direction.

Last year, spawned 123 fish; 46 produced live embryos. 11 of those 46 came up with rene bacterium in ovarian fluid. Not showing clinical signs of BKD. Why such a hard time spawning is unknown. Did change the diet some, and spawned them 5-6 weeks earlier so they would coincide with wild spawning in the Big Hole for future genetic infusion. Leary recommended waiting until at 4 x 3 cross stage for genetic infusion.

Question: Can/Should we stock hatchery fish back into the Big Hole? From a genetic standpoint we can (Leary) since we have three sources of supposedly identical brood populations that are representative of the Big Hole population. The question becomes when and where – and under what conditions would you do this? There was no decision on this question at this meeting.

MOU Discussion (Agreement between USFWS and MFWP)

Specific objectives listed in the MOA

USFWS won't be able to say anything about listing decisions it would make. However, it is useful for setting up parameters of where we will go next.

Question is whether we should revise the MOU between FWP and USFWS, or should we re-do the restoration plan. – Seems there is consensus that we should re-do the Restoration Plan that was originally done in 1994.

Should we include adfluvial fish as well? Based on earlier petition responses and status reviews, the USFWS has determined that fluvial are distinct from adfluvial. Native adfluvial populations would be Red Rocks and Elk Lake. Red Rock population was one of 2 primary sources of grayling for state and federal hatchery systems. Madison was the other.

Recommendation: Keep native fluvial and adfluvial separate to avoid whole bunch of new difficulties and considerations, as well as confusing the public. USFWS is in process of developing a management plan for the Red Rocks that their refuge folks would need to adopt.

Kaya – the group was established on the belief that the purely fluvial grayling of the Big Hole River are different and distinct.

- **Have sub-committee work on revising restoration plan based on their outline of 10 February. Committee members are Bob Snyder, Dick Oswald, Jim Magee, Peter Lamothe, Pat Byorth, Randy Gazda, Lori Nordstrom, and Dan Brewer, and will have a draft for the workgroup to review by next year's meeting.**

- **Lynn Kaeding will continue to work on Red Rocks Management Plan for that population, and will provide copies of that plan for the group to review prior to next year's meeting. If acceptable, it will be incorporated into a combined Missouri River Native grayling plan.**

<u>Red Rocks</u>

No eggs taken last year because of BKD concerns in the hatcheries and concerns about low population numbers. Had small take of Rogers Lake fish (2 inch fish) and planted about 2,000 into Turner's Reservoir at Red Rocks. Trap netted the reservoirs and caught huge amounts of white suckers and no grayling. Will stock it again next year with Red Rocks grayling from Rogers Lake

Did not trap Red Rocks this past year, but saw spawning grayling along the streams. Anglers reported seeing spawning grayling in O'Dell Creek. Did not see any returns of grayling from RSI's.

Yellowstone National Park – some enthusiasm for work in Upper Gallatin – using RSIs – would need to do another EA - **Recommend they initiate the EA.**

2004 Work Plan

I. Primary objectives:

A. Monitor the grayling populations in the Big Hole River through spawning, summer, and fall population surveys.

B. Monitor Axolotl and Green Hollow II Lake's brood reserve populations and collect gametes in Axolotl Lakes and Green Hollow II Reservoir as needed for reintroduction efforts and remote site incubators (RSI). Collect fish for disease testing as needed. Coordinate gamete collection, brood management, health and genetic concerns with USFWS, MFWP and UM personnel.

C. Assess survival, maturity, distribution, and habitat use of grayling reintroduced into the Upper Ruby River, the North and South Forks of the Sun River, Beaverhead, and Missouri River Headwaters.

D. Monitor water temperatures and flows in Big Hole, Ruby, North and South Forks of the Sun, Beaverhead, and Missouri River Headwaters.

E. Habitat - Continue Flow Enhancement Project on the Big Hole River. Identify additional projects to maintain minimum in-stream flows and promote working relationships with local water users. Continue investigation of tributaries for potential water conservation. Continue to assess and identify riparian enhancement, fish passage and irrigation efficiency projects.

F. Work as a technical advisor to the Big Hole Watershed Committee (BHWC) and water users. Refine Drought Management Plan and conservation strategies to ensure the perpetuation of fluvial Arctic grayling in the Big Hole River.

II. Monitoring and Research

A. Spawning Surveys: We will electrofish the McDowell, Wisdom, North Fork, and Pintlar-Squaw sections of the Big Hole River, and additional tributaries as time permits to monitor the spawning grayling population and assess recruitment. Electrofishing will be discontinued when ripe females are encountered to protect spawners and larvae.

B. Axolotl Lakes Brood: We will conduct a mark-recapture survey to assess the population demographics, and collect gametes for future reintroductions or RSIs. Disease sampling protocol will be followed during gamete collections. An additional plant from the Bozeman Technology Center may be made if necessary.

C. Green Hollow II Brood: We will conduct a mark-recapture survey to assess population demographics, and collect gametes for future reintroductions. Disease sampling protocol will be followed during gamete collections. A trap will be maintained

at the inlet to capture trout moving downstream from Green Hollow Creek to decrease potential competition and reduce disease concerns. A barrier will be maintained to prevent grayling attempting to move upstream. An additional year class may be planted from the brood at the USFWS Fish Technology Center.

D. Population Monitoring: Big Hole River: In the upper river we will conduct fall electrofishing mark\recapture surveys to assess population demographics and derive estimates. If flows are sufficient, in 2004 we will survey the Wisdom, 40 Bar, and McDowell tributaries may include but are not limited to Deep Creek, Steel Creek, Swamp Creek, Fishtrap Creek and LaMarche Creek and the "pools" to monitor the grayling population and collect information on sympatric sportfish and native species. We will continue to expand our survey efforts to additional tributaries, side channels and mainstem reaches to better assess population demographics.

E) Distributional and Movement investigations: To identify additional flow and temperature refugia for Arctic grayling during low flow and high temperature regimes we will continue to conduct surveys in tributaries, side channel, and ditches between Jackson and Wise River. Abundance will be assessed through visual observation, snorkeling, electrofishing, and fish traps at various times through summer and fall. Habitat assessment evaluating connectivity, flows, temperatures and riparian health will be completed for each reach.

F) Wise River: We will continue to work with BDNF to assess grayling use and origin in Wise River and tributaries. Electrofishing and snorkeling surveys will be completed at various times throughout the summer and fall. Fin clips will be taken for genetic analysis. Tags will be deployed to identify individual fish and track movement, growth etc.

III. Habitat

A. Temperature Monitoring: We will continue to expand temperature monitoring from mainstem Big Hole to tributaries to assess thermal refugia. Hobo temperature loggers will also be deployed in the Ruby, Sun, and Beaverhead Rivers.

B. In-stream Flow Protection and Discharge Monitoring: We will continue to monitor flows in the upper Big Hole River. We will work closely with the USGS and DNRC to more accurately update the USGS gauge during low flow regimes. We will work closely with the BHWC to review The Drought Management Plan and make changes as needed. For summer 2004, 19 stock water wells and 2 springs and 2 pipelines will be operable. We will investigate and promote additional water conservation projects.

C. Water Budget Study: The purpose of the study is to assess flow gains and losses in the upper Big Hole River. The project will assist in identifying areas to apply water conservation efforts. In 2004, we will continue work initiated in 2002-2003 and will repeat the assessment between Peterson's Bridge and Steel Creek. We will also continue to expand the study upstream into the North Fork and possibly additional tributaries. This is a cooperative study with DNRC/ MFWP, and PFWP.

D) Wetted Perimeter: We have recommended to the BHWC an adaptation to the Drought Management Plan by adding a minimum spring flow equal to the upper wetted perimeter flow (160 cfs) during grayling emergence in the upper Big Hole spawning reaches. Spring flows in the upper Big Hole River have fallen below this critical level in previous years and may partially explain the current poor level of grayling recruitment.

E) Fish Passage : We will investigate headgates or diversions that may inhibit fish passage. We will propose alternatives to landowners to enhance fish passage as needed.

F) Riparian Enhancement: We have constructed a GIS database based on the habitat inventory from the upper Big Hole in 1994. The database will assist in prioritizing riparian enhancement projects. We are currently working with landowners complete projects initiated in 2003 and to assess potential projects for 2004 and beyond.

IV. Reintroductions

A. Plant Numbers for 2004:

- Bluewater State Fish Hatchery: 70,000, Origin Axolotl Lakes, Average length 8.7" June 1.
- Bozeman Fish Technology Center: Age 2: 1,500, Completed Brood, Average length 9.5"

B. Plant Locations:

- Ruby River: We will recommend yearling stocking rates depending on overwinter survival of 2003 plants. Surveys to assess survival will be completed in April 2004. Ruby will receive 1,500 age 2 grayling from BFTC and 225,000 eyed eggs for RSI.
- North Fork Sun River: Collect Temperature Data/RSIs?
- South Forks Sun River: No Fish
- Lower Beaverhead River: No Fish
- Missouri River Headwaters: Back up for Ruby Fish

C. Planting Schedule:
Yearlings; May 3 - May 24, 2004
Age 2: June 2004
RSIs: May 20-June 15, 2004.

A. Ruby River: We will continue to monitor survival of grayling planted into the upper Ruby River. We will conduct spring surveys to assess survival, movement, distribution, and spawning potential. We will continue fall electrofishing surveys in the Vigilante, Section One, and others as needed to monitor grayling plants and rainbow, cutthroat, and brown trout populations. Dick Oswald will continue surveys on the Three Forks and

Greenhorn sections and gill netting in Ruby Reservoir. We will continue to use the voluntary creel to assess capture rates, species composition, distribution etc. We will continue to use RSIs and assess success at different locations and with eyed eggs. We will monitor RSI success through out summer and fall. We will continue to track whirling disease and assist Dick Vincent as needed.

B. Sun River: Objectives for 2004 are to 1) Determine if any grayling are remaining in the two forks 2) Determine if any natural reproduction has occurred, 3) Investigate life history patterns of grayling in Gibson Reservoir and tributaries, 4) Determine if grayling have moved downstream into Diversion Reservoir and 5) Continue temperature assessment in the North and South Forks and tributaries and/or or use RSIs.
To assess survival, distribution, growth, condition factor, of 1999-2001 plants, we will assist Region 4 personnel with spring surveys in Gibson Reservoir, Diversion Dam and electrofishing surveys at the mouths of the North and South Forks. We may snorkel reaches from Ray Creek to the Wilderness Boundary on the North Fork. We will further investigate Gibson tributaries as potential spawning and rearing habitats. Volunteer angler surveys will be continued. Thermographs will be deployed in mainstem and tributaries.

C. Beaverhead River: Planted grayling from 1999-2002 will be monitored by electrofishing three traditional sections in both spring and possibly fall if instream flows and temperature regimes are appropriate. The Grayling crew will assist Dick Oswald as needed for surveys. Hobo temperature loggers will be distributed to assess temperature regimes. Flows will be monitored at the USGS Twin Bridges station.

D. Missouri River Headwaters: We will monitor the previous plants with electrofishing surveys coordinated with Spoon and Bozeman Area Management Biologist as time and workload permits. Temperature and flow regimes will continue to be monitored at USGS sites. Any grayling not planted in the Ruby River will be planted in the Missouri River Headwaters Restoration Reach.

Question: North Fork of the Sun – do we want to do RSI's there? Do we want to try to imprint them on that stream? Nothing to lose – main problem is logistics and personnel. Would want to get them eyed up or later in order to wait until temps increase. Would need someone to baby-sit the RSI's until the eggs are ready.

Group agrees YES, as long as adequate number of eggs are available – shouldn't be a problem unless disease or other issues impact egg availability.

All eggs will be taken to Big Springs Hatchery for eye-up

- **Next meeting - March 1, 2005.**